per calorie, or 4·1857 × 10^7 ergs. For the normal scale of the hydrogen thermometer this would be 426·84.

A NEW and very convenient method of preparing acetylene gas is described by M. Maquenne in the current number of the *Comptes Rendus*. A short time ago the same chemist succeeded in preparing a comparatively stable compound of carbon with the metal barium, BaC_2, by heating powdered retort-charcoal with barium amalgam in a current of hydrogen. Upon bringing this compound in contact with water a violent action was found to occur with evolution of almost pure acetylene gas. On account, however, of the troublesome nature of the operations of procuring barium amalgam and preparing from it the new compound, together with the very small quantities of the latter eventually obtained, this mode of preparing acetylene was only of theoretical interest, and not suitable as a laboratory method of preparation. M. Maquenne now describes a new process for preparing barium carbide, by means of which large quantities may very readily be procured in a few minutes, and from which correspondingly large volumes of acetylene may be derived. The principle of the method consists in reducing barium carbonate by metallic magnesium in presence of carbon. An intimate mixture is first made of barium carbonate prepared by precipitation, powdered metallic magnesium, and calcined retort-carbon. Convenient amounts are twenty-six grams of barium carbonate, ten and a half grams of magnesium, and four grams of charcoal. This mixture is then introduced into an iron bottle of about seven hundred cubic centimetres capacity, furnished with a tube, also of iron, thirty centimetres long and two centimetres internal diameter. The iron bottle is then heated in a gas furnace which has previously been raised to a red heat. At the expiration of about four minutes an energetic reaction occurs, accompanied by the projection of brilliant sparks from the mouth of the tube. The apparatus should then at once be removed from the furnace, the end of the tube stopped, and the bottle and contents rapidly cooled by the external application of cold water. The product may then be extracted, when it is found to consist of a mixture of magnesia with 38 per cent. of carbide of barium, a little excess of carbon, and a trace of cyanide formed at the expense of the atmospheric nitrogen. The reaction accords very closely with the equation :—

$$BaCO_3 + 3Mg + C = BaC_2 + 3MgO.$$

Carbide of barium may be preserved for an indefinite time in a dry atmosphere. It is a grey, porous, and very friable substance. When heated to redness in the air it burns with a vivid incandescence. It is also capable of combustion in chlorine, hydrochloric acid gas, and vapour of sulphur. In order to prepare acetylene from it the powder is most conveniently placed in a small flask fitted with a doubly-bored caoutchouc stopper, carrying a dropping funnel containing water, and a delivery tube. The moment water is allowed to drop the equivalent quantity of acetylene gas is evolved in accordance with the equation :—

$$BaC_2 + 2H_2O = Ba(OH)_2 + C_2H_2.$$

The delivery of the acetylene may be regulated with great nicety by suitable adjustment of the stopcock of the dropping funnel. The acetylene thus prepared possesses the further advantage of being remarkably pure, containing 98 per cent. of C_2H_2. It is interesting to learn that by allowing a stream of this pure acetylene to pass through a long heated glass tube for a few hours several grams of synthetical benzene have been accumulated by M. Maquenne.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus* ♀) from India, presented by Mr. W. F. Faulding; a Buffon's Touracou (*Corythaix buffoni*) from West Africa, presented by Mr. A. L. Jones; two Double-banded Sand Grouse (*Pterocles bicinctus* ♂ ♀) from Senegal, presented by Mr. H. H. Sharland, F.Z.S.; a Gannet (*Sula bassana*), British, presented by Dr. Davis; a Roseate Cockatoo (*Cacatua roseicapilla*), a King Parrakeet (*Aprosmictus scapulatus* ♀) from Australia, presented by Mrs. Addiscott; four Alligators (*Alligator mississippiensis*) from the Mississippi, presented by Mr. John Terry; two Thick-billed Seed-eaters (*Oryzoborus crassirostris*), a Tropical Seed Finch (*Oryzoborus torridus*), a Saffron Finch (*Scyzalis flaveola*), a Bluish Finch (*Spermophila cœrulescens*) from South America, a Puff Adder (*Vipera arietans*) from West Africa, deposited.

OUR ASTRONOMICAL COLUMN.

COMET BARNARD (OCTOBER 12).—An *Astronomische Nachrichten* circular note gives the following elements and ephemeris, computed from observations made on the 16th, 17th, and 18th of this month :—

Elements.

T = 1892 Nov. 12·745 Berlin M.T.

$\omega = 168^\circ\ 49'$
☊ $= 220\ 50$
$i = 21\ 39$
log. $q = 0·03669$

Ephemeris Berlin Midnight.

1892.	R.A. h. m.	Decl. ° ′	Log Δ.	Br.
Oct. 25	20 6·6	+7 47		
27	13·5	6 51	9·6825	1·46
29	21·5	5 52		
31	29·8	4 51	9·6609	1·66
Nov. 2	38·7	3 47		
4	48·2	2 40	9·6377	1·87
6	20 58·3	1 29		

As the brightness at the time of discovery is taken as unity, it will be noticed that the comet is quickly gaining in intensity, the value for November 8 being 2·08 Br. Its position on the 31st lies in the southernmost part of the constellation of the Dolphin, forming very nearly an equilateral triangle with α Aquilæ and β Delphini.

DISCOVERY OF THREE NEW PLANETS BY PHOTOGRAPHY.—M. Perrotin has communicated to the French Academy an account of the discovery of three small planets by M. Charlois, of the Nice Observatory, by the aid of photography. The apparatus employed consisted of an Hermagis portrait lens of 15 cm. aperture and 80 cm. focal length, mounted provisionally on M. Loewy's *equatorial coudé*. The instrument was being employed for the photography of the region of the ecliptic. With exposures ranging from two hours and a half to three hours, the eight negatives obtained since September 12 cover a region 80° long and 10° broad, and show all the stars visible through the 38 cm. refractor. A careful examination of the plates reveals the presence of three unknown and eight known planets. The former, now known under the names 1892, D, E, and F, are all of about the twelfth magnitude.

RUTHERFURD MEASURES OF STARS ABOUT β CYGNI.—Mr. Harold Jacoby, in No. 4 of the *Contributions from the Observatory of Columbia College, New York*, presents us with the reduced results of the measures of the plates containing the group of stars surrounding β Cygni. The method of measurement was exactly the same as that employed in the case of the Pleiades plates, but that of reduction has received some slight modification. For instance, the measures of the eastern and western impressions have not been separately dealt with, but their mean has been taken, and the reduction continued, using this mean as a single observation. As the accuracy of these measurements depend on the exactitude of the scale value determinations to a very considerable extent, it is satisfactory to hear that this value has remained materially the same for a very long period. The largest and smallest values recorded in the Pleiades plates were 28″·0167 and 28″·0066, the mean value amounting to 28″·0124, and it is

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his last-mentioned value that has been used in the above reductions. The probable error of these determinations is then ±0″·00071, which corresponds to ±0″·025 per 1000″. But Mr. Jacoby does not think that the average uncertainty of the final places exceeds 0″·15 on account of scale value. While comparing the Rutherfurd stars with those of Argelander, he found that four stars from the latter were lacking, while they were recorded on the original negatives of the former. Observations made this year showed that three were visible, while the fourth (No. 28), which was quite close to No. 27 on the Rutherfurd negatives, was this year "only a sort of elongation of No. 27." On the other hand, the following of Argelander's stars were absent from the plates:—

B.D.	+ 27·3395	Mag.	8·8
	+ 27·3414	,,	9·0
	+ 27·3417	,,	9·0

and perhaps

+ 27·3435	,,	8·5
+ 28·3343	,,	9·0

A NEW VARIABLE STAR.—In *Astronomische Nachrichten*, No. 3124, Prof. Pickering announces the discovery of a new variable star in Aries by Prof. Schaeberle. The fact of this star being a variable was first noted when, on an examination of two plates taken December 18 and January 24, 1891, it was found that on the former it appeared of the 9·5 magnitude, while on the latter it was absent altogether. Recent visual observations have shown, however, a star of the eleventh magnitude in the exact position of the suspected variable, and this has been confirmed by means of photographs. From photographs of the same region, taken since October 31, 1890, the magnitudes recorded have been 9·6, 10·2, 11·0, less than 11·7, 10·1, 10·0, 10·4, 10·3, and 10·9. The star's position for 1900 is given as

R.A. 3h. 5·5m. Decl. + 14°24′.

JUPITER'S FIFTH SATELLITE.—It hardly ever happens that, after a discovery of any importance has been made, there are not a few "claimants" who wish to annex it as their own. This is the case with Prof. Barnard's discovery of the fifth moon to Jupiter, but the advantage he possesses over these said "claimants" is, we might say, infinite, for it is only with such an instrument as that at the Lick Observatory that this "mite" of a satellite can be observed with success. One of the despatches in which one "claimant's" views were put forth, had the audacity to insinuate that Prof. Barnard was directly inspired to this discovery by information contained in a letter sent to the Observatory. We are glad to see that Prof. Barnard deals with these "claimants" as they deserve, and we hope it may be a lesson to others who wish to assert their priority without good and sufficient reasons for doing so.

As an illustration of the difficulty of observing this satellite, we may mention that Prof. Young, in a letter to Prof. Barnard, says that although he has used a 23 inch Clark, which is an instrument as nearly perfect as can be made, he was not rewarded with success.

THE SPECTRUM OF NOVA AURIGÆ.—Herr E. von Gothard, of the Observatory at Herény, has taken a very successful photograph of the Nova spectrum, the results of which he communicates to *Astronomische Nachrichten*, No. 3122. The instrument used was a 10¼-inch reflector with a 10-inch objective prism, and the exposure given amounted to 45 minutes. The spectrum shows six lines, and a comparison with the spectrum of the ring nebula and the Wolf-Rayet stars presented a remarkable concordance, the first failing only in the second Nova line, and the second differing only with regard to the intensity of the individual lines. The following table shows this somewhat more clearly:—

	I.	II.	III.	IV.	V.	VI.	VII.
Nova ...	6	1	10	5	3	4	—
G. C. 4964	8	2	10	6	6	8	—
Ring nebula	8	—	5	2	7	6	10

The wave-lengths of the lines are, we are sorry to say, not inserted.

"JUPITER AND HIS SYSTEM" is the title of a small book recently published by Mr. Stanford, and written by Miss E. M. Clarke. The authoress has brought this book out at a time when this planet is receiving most attention, for was it not in opposition, shining with exceeding brightness, on the 12th of this month? One great point about this little monograph is that facts throughout have been strictly adhered to, so that the reader is presented with the true state of the planet as we know it. The information is well up to date, as for example the mention of the new satellite, and the book is written in a popular yet accurate style. One thing that calls for attention is the price (one shilling), which could doubtless have been halved.

GEOGRAPHICAL NOTES.

MR. J. Y. BUCHANAN, F.R.S., is this term delivering a course of lectures on Oceanography in Cambridge University. It is satisfactory to know that the lectures are better attended than has been the case since the foundation of the Geography lectureship, and that the greater number of those present this term are undergraduates.

MR. JOSEPH THOMSON has submitted to the British South Africa Company the report of his journey to the Lake Bangweola region, made last year, which ill-health has prevented him from preparing sooner. He speaks of Northern Zambesia generally as a region of great possibilities. It is a plateau rarely less than 3500 feet high, with a climate in which Europeans should find no difficulty in living for several years at a time. It is well suited for cattle-rearing and for planting, and there is an appearance of mineral wealth. Like the rest of tropical Africa, the land must be occupied and cultivated, and the natives must be trained to industry before commercial results of any importance can be obtained.

THE special meeting of the Royal Geographical Society to hear Captain Lugard's paper on Uganda will be held on Thursday, Nov. 3, at 8.30 p.m. On account of the great popular interest at present being manifested in the region of the Equatorial lakes, no extra tickets can be issued by the Society, as the attendance of Fellows and their friends will probably more than fill the hall.

THE new number of *Petermann's Mitteilungen* contains some articles of considerable interest. Dr. W. Ruge, son of the well-known geographer, Dr. Sophus Ruge, contributes a short but learned treatise on the geography of Asia Minor, which combines literary research with personal exploration. Dr. Ernst H. L. Krause produces an interesting map of North Germany, showing the distribution of forests and the most common species of trees during the Middle Ages. This work is accomplished mainly by the consultation of old records, and the examination of the remains of old forests and very ancient trees. The study of history is greatly helped by such a map, and the influence of increasing density of population and extending cultivation of farm crops is brought out strikingly by comparison with a map of the vegetation at the present day. Dr. Karl Sapper's description of Lake Yzabal in Guatemala is also worthy of note.

GEIKIELITE AND BADDELEYITE, TWO NEW MINERAL SPECIES.

VARIOUS pebbles were lately brought to this country by Mr. Joseph Baddeley, who has been acting as manager of a Gem and Mining Company in Ceylon. They had been picked up by him in the neighbourhood of Rakwana (Rackwanné) at various times, and had then attracted his special attention by reason of their high specific gravity. Their real nature not being evident on inspection, Mr. Baddeley, when invalided, brought them home to England for identification.

One kind of pebble, kindly analyzed for him by Mr. Claudet, was found to be essentially a tantalate of yttrium.

Pebbles of another kind were taken to the Museum of Practical Geology in Jermyn Street for examination. The external characters being found by Mr. Pringle insufficient for the determination of the species, the pebbles were handed over to Mr. Allan Dick for chemical investigation. Quantitative analysis proved the mineral to be essentially magnesium titanate ($MgTiO_3$) and chemically analogous to Perofskite, calcium titanate ($CaTiO_3$). To this interesting new species Mr. Dick, in a paper read before the Mineralogical Society in June, gave the name Geikielite, in honour of Sir Archibald Geikie, F.R.S., Director-General of the Geological Survey, in whose laboratory the analysis had been made.

As described by Mr. Dick, Geikielite has a specific gravity

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